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CERTIFICATION DESIGN LETTER FOR FORMER SOIL STOCKPILE 3 FOOTPRINT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

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U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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LIST OF ACRONYMS AND ABBREVIATIONS

A2PII	Area 2, Phase II
ASCOC	area-specific constituent of concern
ASL	analytical support level
CDL	Certification Design Letter
COC	constituent of concern
CRDL	contract required detection limits
CU	certification unit
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FRL	final remediation level
mg/kg	milligram per kilogram
OEPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OU5	Operable Unit 5
pCi/g	picoCuries per gram
PID	photoionization detector
PSP	Project Specific Plan
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RTRAK	Radiation Tracking System
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SP3	Soil Stockpile 3
SWRB	Storm Water Retention Basin
SWUs	Southern Waste Units
UCL	Upper Confidence Limit
WAC	waste acceptance criteria

EXECUTIVE SUMMARY

This Certification Design Letter (CDL) describes the certification approach for the former soil Stockpile 3 (SP3) footprint. This footprint lies within Area 2, Phase II (A2PII). The CDL contains all information required to support the primary certification objectives discussed in Section 1.1.

The scope of this CDL is limited to the former SP3 footprint, which is an 2.8-acre area located just south of the Storm Water Retention Basins west chamber and northeast of the Southern Waste Units. The former stockpile was generated from numerous construction activities at the Fernald Environmental Management Project (FEMP) and was excavated in Spring 2000.

The certification design presented in this CDL follows the general Approach A outlined in the Sitewide Excavation Plan (SEP; DOE 1998). The selection of SP3 footprint area-specific constituents of concern (ASCOCs) was accomplished using constituent of concern (COC) lists in the Operable Unit 5 Record of Decision (DOE 1996), process knowledge of the site COCs and release history. A total of two Group 1 certification units were established. Total uranium, thorium-228, thorium-232, radium-226, and radium-228 (the sitewide primary COCs) will be considered ASCOCs for both CUs. In addition, total arsenic and beryllium will be considered secondary COCs for both CUs. Field sampling is expected to begin by late October 2000 and the Certification Report will be issued within 90 days after sampling is complete.

1.0 INTRODUCTION

This Certification Design Letter (CDL) describes the certification approach for demonstrating that soil in the former soil Stockpile 3 (SP3) footprint meets the final remediation levels (FRLs) for all area-specific constituents of concern (ASCOCs). The format of this CDL follows Sitewide Excavation Plan (SEP; DOE 1998) guidelines.

The A2PII former SP3 footprint (Figure 1-1) is northeast of the Southern Waste Units (SWUs) and south of the Storm Water Retention Basins (SWRBs) west chamber. The 2.8-acre footprint of SP3 was a former softball field that was constructed in the early 1950s for use by site employees. Stockpiling of soil within the footprint was initiated in 1988 with the placement of excavated material from the SWRB project. SP3 was then used to accommodate excess soil generated during various construction projects in previously uncontrolled areas.

In March 1999, waste acceptance criteria (WAC) characterization and predesign sampling was conducted under the Project Specific Plan (PSP) for Sampling SP3 for On-Site Disposal Facility (OSDF) WAC Attainment (DOE 2000a). The pile was then excavated and placed in the OSDF. After the stockpile was excavated, a real-time scan was conducted for WAC determination followed by an additional 6-inch scrap over the surface of the footprint. A magnetometer scan was conducted over the SP3 footprint and all identified debris (mostly fence post foundations) was removed.

1.1 OBJECTIVES

The primary objectives of this document are to:

- Define the area boundary addressed in this CDL
- Present maps of historical data and recently acquired real-time and physical soil sample data
- Define the ASCOC selection process and list the selected ASCOCs for the SP3 footprint
- Present the certification unit (CU) boundary and proposed sampling strategy

- Summarize the analytical requirements and the statistical methodology that will be employed

- Present the proposed certification schedule.

1.2 SCOPE

The scope of this CDL is the certification of the former SP3 footprint, which consists of two CUs. The small ditch area between the south construction road and footprint boundary will be certified during certification of roads and corridors. This ditch can then catch runoff from the road and will not impact the certified area. The CU design is described in Section 4.1 and depicted in Figure 4-1. The certification process began with real-time precertification scanning activities under the PSP for Predesign Sampling in A2PII Parts Two and Three (DOE 2000b) and will be concluded with certification sampling under the PSP for Certification Sampling of the Former SP3 Footprint (DOE 2000c).

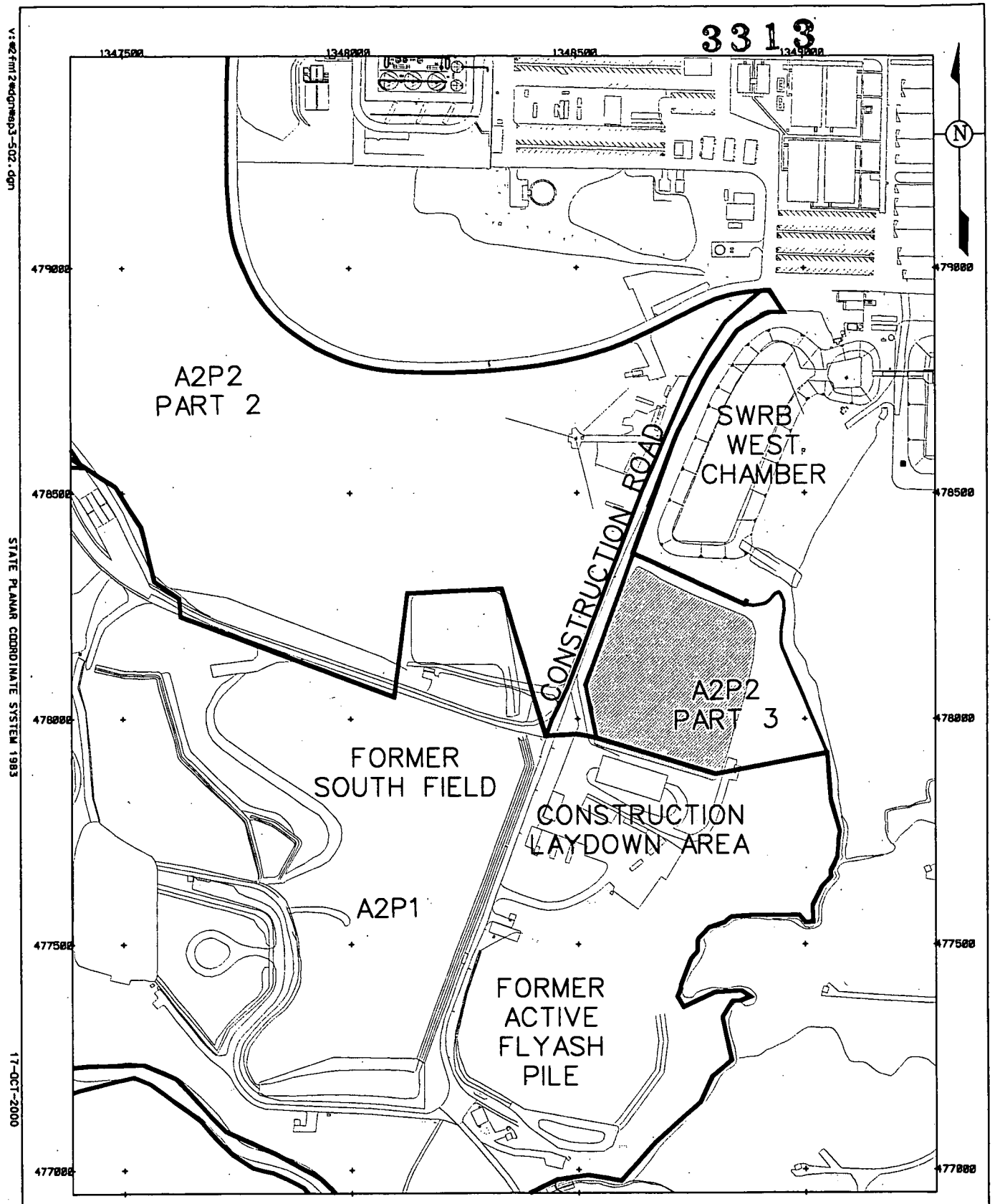

FIGURE 1-1. A2PII SP-3 FOOTPRINT LOCATION MAP

2.0 HISTORICAL, PREDESIGN AND PRECERTIFICATION DATA

In accordance with the SEP, all soil demonstrating contamination above the associated FRLs or other applicable action levels must be evaluated for remedial actions prior to conducting precertification and certification activities.

Before initiating certification, all historical soil data pertinent to SP3 and the SP3 footprint was pulled from the Sitewide Environmental Database (SED), including data within a 25-foot buffer surrounding the subject area. The data is summarized in the following sections.

2.1 RI/FS AND HISTORICAL DATA REVIEW

The development and list of FRLs pertinent to Operable Unit 5 (OU5) are presented in the OU5 Record of Decision (ROD; DOE 1996). The SED data pull showed no physical remedial investigation/feasibility study (RI/FS; DOE 1995) sample locations within the actual footprint of SP3. The historical data associated with the soil placed in SP3 was also pulled from the SED and evaluated. Soil data from the excavation projects contributing soil to SP3 spanned all SEP Remediation Areas except Areas 3 and 4. Thus, the Area 1, 2, 5, 6, and 7 constituents of concern (COCs) were used as a basis to evaluate the ASCOCs. The soil pile historical data prior to predesign sampling is summarized in Table 3-1, including the reasoning for retaining or not retaining the COC as an ASCOC.

2.2 WAC SAMPLING OF THE SOIL PILE MATERIAL

Characterization of the stockpile material was conducted to determine WAC attainment. Prior to the sampling investigation, data from the soil that was placed in the stockpile was assessed to determine WAC COCs and the sampling frequency. Detailed information regarding the WAC COC selection process can be found in the PSP for Sampling of SP3 for OSDF WAC Attainment. In accordance with the PSP for Sampling SP3 for OSDF WAC Attainment, 24 borings were collected and a total of 48 samples were submitted for analysis for total uranium and technetium-99. The entire core at all boring locations was scanned with a beta/gamma frisker and a photoionization detector (PID). No frisker or PID results were above background. All analytical results for total uranium and technetium-99 were below WAC and FRL. This analytical data is presented in Appendix A and is accessible through the SED.

2.3 SAMPLING/MEASUREMENTS OF THE SP3 FOOTPRINT

Two additional investigations have been conducted in the SP3 footprint pursuant to the RI/FS phase:

- Predesign FRL Sampling of the Soil SP3 footprint
- FRL Scanning.

The purpose of these investigations is discussed in the following paragraphs; the results of the investigations are presented in Appendices B and C.

2.3.1 Predesign FRL Sampling of the Soil Pile Footprint

Predesign FRL data was collected in accordance with the guidelines established in Section 3.1.2 of the SEP. During WAC attainment sampling of SP3, ten of the 24 sample locations were randomly selected and advanced beyond the soil pile footprint, a minimum of 3.5 feet into native soil (Figure 2-1). Predesign samples were collected and analyzed for the primary radionuclide COCs. The entire predesign core was screened using a beta/gamma (Geiger-Mueller) survey meter. No above-background readings and no visibly impacted material was encountered. As a result, the first 6-inch soil interval within the predesign sample was submitted for each of the ten borings. The analytical results for all samples were below-FRL for all the primary COCs. This analytical data are presented in Appendix B and is accessible through the SED.

2.3.2 FRL Scanning

According to guidelines established in Section 3.3.3 of the SEP, precertification activities were conducted to evaluate residual radiological contamination patterns. A surface radiation survey was conducted over the accessible areas of the SP3 footprint during predesign of A2PII Parts Two and Three in October 2000. Since no further remediation activities took place within this footprint and these data were obtained within the precertification guidelines, these real-time measurements will be used as the precertification scan for this area. These data were then used to evaluate residual radiological contamination patterns and assist in confirming CU designs. Some of Radiation Tracking System (RTRAK) data were above one times the FRL, but below three times the FRL, which is below the certification "hot spot" criterion. All precertification data is presented in Appendix C and is accessible through the SED.

The total population of the data used to support the conclusion that the area is ready for certification consists of predesign data and precertification data from the SP3 footprint.

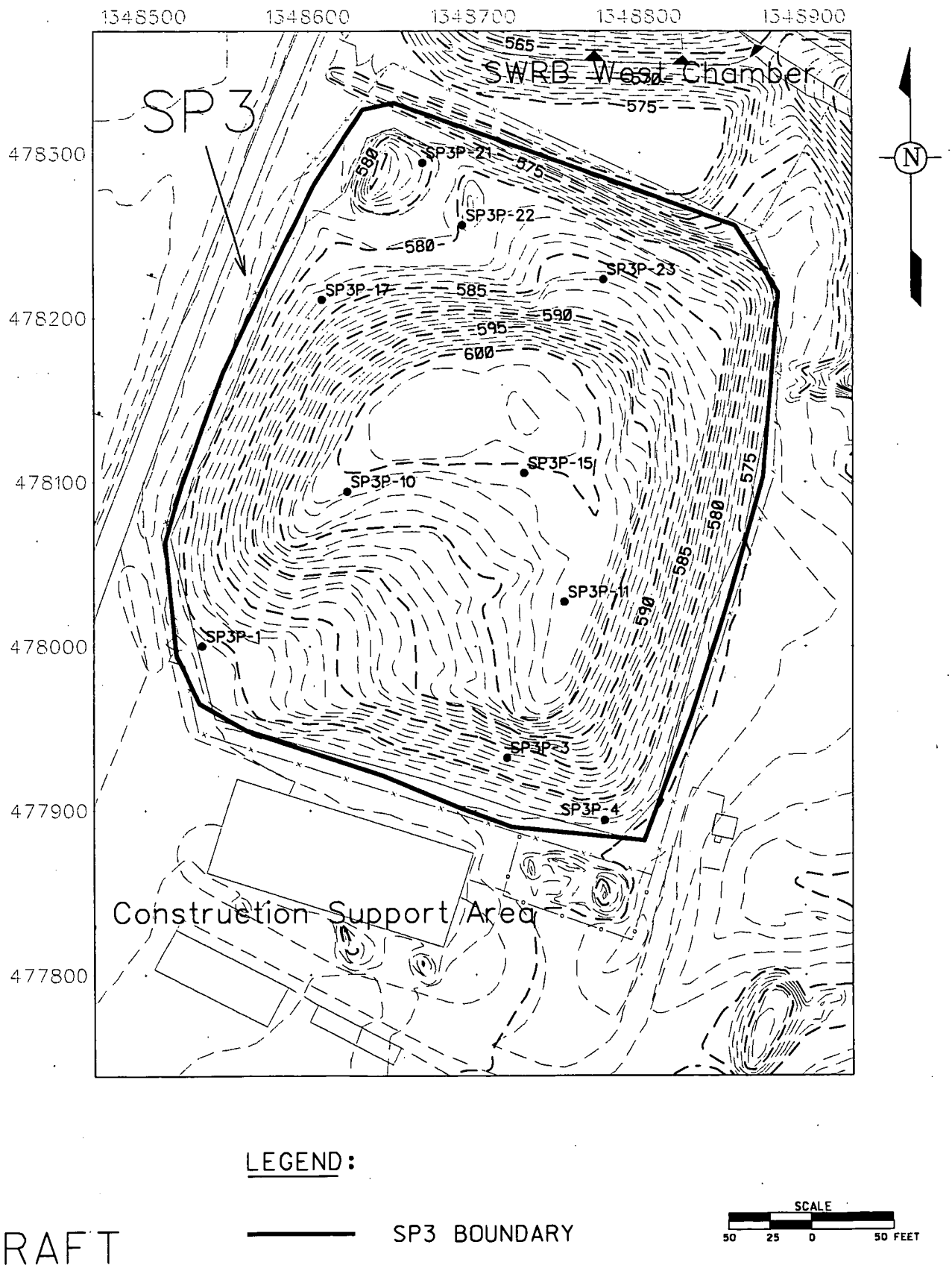

FIGURE 2-1. SP3 PREDESIGN SAMPLE LOCATIONS

3.0 AREA-SPECIFIC CONSTITUENTS OF CONCERN

In the OU5 ROD, there are 80 soil COCs with established FRLs. These COCs were retained for further investigation based on a screening process that considered the presence of the constituent in site soil and the potential risk to a receptor exposed to soil containing this contaminant. In spite of the conservative nature of this COC retention process, many of the COCs with established FRLs have a limited distribution in site soil or the presence of the COC is based on high contract required detection limits (CRDLs). When FRLs were established for these COCs in the OU5 ROD, they were initially screened against site data presented on spatial maps to establish a picture of potential remediation areas.

By reviewing existing RI/FS data presented on spatial distribution maps, it was possible to reduce the sitewide list of soil COCs from 80 listed in the OU5 ROD to 30. This reduction was possible because the majority of the COCs with FRLs listed in the OU5 ROD have no detections on site above their corresponding FRL, thus eliminating them from further consideration. The 30 remaining sitewide COCs account for over 99 percent of the combined risk to a site receptor model, and they comprise the list from which all of the remediation ASCOCs are drawn. When planning certification for a remediation area, additional selection criteria are used to derive a subset of these 30 COCs. This subset of COCs is passed along to the certification process.

3.1 SELECTION CRITERIA

The selection process for retaining ASCOCs for a remediation area is driven by applying a set of decision criteria found in the SEP. A soil contaminant will be retained as a SP3 footprint ASCOC if:

- It is listed as a soil COC in the OU5 ROD
- It can be traced to site use, either through process knowledge or known release of the constituent to the environment
- Analytical results indicate the contaminant is present at a concentration above its FRL, and the above-FRL concentrations are not attributable to false positives or elevated CRDLs
- Physical characteristics of the contaminant, such as half-life, indicate it is likely to persist in the soil between time of release and remediation
- The contaminant is one of the sitewide primary COCs (total uranium, radium-226, radium-228, thorium-232, and thorium-228).

3.2 ASCOC SELECTION PROCESS FOR SP3 FOOTPRINT

Total uranium, radium-226, radium-228, thorium-228 and thorium-232 are sitewide primary COCs and will be retained as ASCOCs.

Historical aerial photos indicate no production operations were conducted in the former SP3 footprint. The area was used primarily as a softball field prior to the creation of the soil pile. Table 3-1 shows the data from the stockpiled soil and the reasoning for retaining or not retaining the secondary COC as an ASCOC. Based on these factors, only arsenic and beryllium will be retained as secondary ASCOCs. The ASCOC list can be found in Table 3-2.

TABLE 3-1
SECONDARY ASCOC LIST
Based on Data Associated with the Soil from the Former Stockpile 3

Area 1,2,5,6 and 7 Secondary ASCOC	Above FRL Hits	Above-FRL results with detects	Range of above-FRL detected results	Number of Samples	Retained as an ASCOC	Reason for Not Retaining as an ASCOC
Aroclor-1254	43	3	0.14 – 0.69 mg/kg	43	No	No unusual staining discovered during remediation of SP3 and no elevated PID measurements during SP3 predesign sampling and remediation.
Aroclor-1260	43	0	N/A	43	No	All hits are non-detections with CRDLs greater than the FRL.
Arsenic	2	1	14.1 mg/kg	42	Yes	N/A.
Benzo(a)pyrene	0	N/A	N/A	43	No	No hits at or greater than FRL
Benzo(b)fluoranthene	0	N/A	N/A	43	No	No hits at or greater than FRL
Beryllium	5	4	1.6 – 2.1 mg/kg	39	Yes	N/A
Bromodichloromethane	56	0	N/A	65	No	All hits are non-detections with CRDLs greater than the FRL. Expect compound to have volatized completely during initial excavation and placement into SP3. Also, no elevated PID measurements indicated during SP3 predesign sampling and remediation.
Cesium-137	42	0	N/A	294	No	All hits are non-detections with CRDLs greater than the FRL.
Dibenzo(a,h)anthracene	43	1	2.2 mg/kg	43	No	Expected compound to have volatized completely during initial excavation and placement into SP3. No elevated PID measurements indicated during SP3 predesign sampling and remediation.
1,1-Dichloroethene	50	0	N/A	63	No	All hits are non-detections with CRDLs greater than the FRL. Expect compound to have volatized completely during initial excavation and placement into SP3. Also, no elevated PID measurements indicated during SP3 predesign sampling and remediation.
Dieldrin	43	0	N/A	49	No	All hits are non-detections with CRDLs greater than the FRL.
Fluoride	0	N/A	N/A	0	No	Data is not available. Compound not expected in the area.

TABLE 3-1
SECONDARY ASCOC LIST
Based on Data Associated with the Soil from the Former Stockpile 3
(Continued)

Area 1,2,5,6 and 7 Secondary ASCOC	Above FRL Hits	Above-FRL results with detects	Range of above-FRL detected results	Number of Samples	Retained as an ASCOC	Reason for Not Retaining as an ASCOC
Heptachlorodibenzo-p-dioxins	2	0	N/A	2	No	All hits are non-detections with CRDLs greater than the FRL. Expect compound to have volatized completely during initial excavation and placement into SP3. Also, no elevated PID measurements indicated during SP3 predesign sampling and remediation.
Indeno(1,2,3-cd)pyrene	43	0	N/A	43	No	All hits are non-detections with CRDLs greater than the FRL. Expect compound to have volatized completely during initial excavation and placement into SP3. Also, no elevated PID measurements indicated during SP3 predesign sampling and remediation.
Lead	0	N/A	N/A	69	No	No hits are at or greater than FRL
Manganese	0	N/A	N/A	39	No	No hits are at or greater than FRL
Neptunium-237	1	0	N/A	125	No	All hits are non-detections with CRDLs greater than the FRL.
Octachlorodibenzo-p-dioxins	2	0	N/A	2	No	All hits are non-detections with CRDLs greater than the FRL. Expect compound to have volatized completely during initial excavation and placement into SP3. Also, no elevated PID measurements indicated during SP3 predesign sampling and remediation.
Technetium-99	0	N/A	N/A	168	No	No hits are at or greater than FRL
Tetrachloroethene	52	0	N/A	70	No	All hits are non-detections with CRDLs greater than the FRL.
Thorium-230	0	N/A	N/A	71	No	No hits are at or greater than FRL

mg/kg – milligrams per kilogram

TABLE 3-2
ASCOC LIST FOR SP3 FOOTPRINT CUs

ASCOC	FRL	Reason Retained
Total Uranium	82 mg/kg	Retained as a primary ASCOC sitewide
Radium-226	1.7 pCi/g	Retained as a primary ASCOC sitewide
Radium-228	1.8 pCi/g	Retained as a primary ASCOC sitewide
Thorium-228	1.7 pCi/g	Retained as a primary ASCOC sitewide
Thorium-232	1.5 pCi/g	Retained as a primary ASCOC sitewide
Arsenic	12 mg/kg	Retained as a secondary ASCOC sitewide
Beryllium	1.5 mg/kg	Retained as a secondary ASCOC sitewide

pCi/g - picoCuries per gram

4.0 CERTIFICATION APPROACH

4.1 CERTIFICATION DESIGN

The certification design for the former SP3 footprint follows the general approach outlined in Section 3.4 of the SEP. As discussed in Section 3.0 of this document, total uranium, thorium-228, thorium-232, radium-226, radium-228, arsenic, and beryllium will be retained in all CUs as the only CU-specific ASCOCs.

4.1.1 *CU Design*

The certification design and sampling strategy follows Section 3.4 of the SEP. The certification area consists of the following:

- Two Group 1 CUs: one consisting of the northern section of the footprint (A2P2-SP3-C-1) and one consisting of the southern section of the footprint (A2P2-SP3-C-2).

Two Group 1 CUs (which can be as large as 62,500 square feet) are identified and depicted in Figure 4-1. The two Group 1 CUs cover the entire area of the SP3 footprint and are bounded to the north and east by run-off berms. The small ditch area between the road and footprint boundary will be certified during certification of roads and corridors. This ditch can then catch run-off from the road and will not impact a certified area.

The selection of certification sampling locations was conducted according to Section 3.4.2 of the SEP. Each CU was first divided into 16 approximately equal sub-CUs. Sample locations were then generated by randomly selecting easting and northing coordinates within each sub-CU boundary, and testing the locations against the minimum distance criterion for the CU. If the minimum distance criterion was violated, then an alternative random location was selected for that sub-CU, and all the locations were re-tested. This process continued until all 16 random locations met the minimum distance criterion. The selected SP3 footprint certification sampling locations are shown in Figure 4-2.

The allowable minimum distance between pairs for CU 1 was 7.8 between A2P2-SP3-C-1-3 and A2P2-SP3-C-1-7 and for CU 2 was 4.2 between A2P2-SP3-C-2-10 and A2P2-SP3-C-2-14. Of note, it is possible that subsurface obstacles (e.g., buried rocks or tree roots) could prevent collection at the planned

location. If this is the case, the location can be moved up to 3 feet from the original location, as long as it remains within the same CU and sub-CU boundary. A check of the minimum distances between locations reveals that such a move would not cause a violation of the minimum distance criterion for even the closest of location pairs. A move of more than 3 feet would require a minimum distance recheck and approval from the U.S. Environmental Protection Agency (EPA) and Ohio Environmental Protection Agency (OEPA).

Discrete soil samples will be collected from each of the 16 random sampling locations. Each sample will be collected from the 0 to 6-inch (surface) soil interval at the designated and surveyed sample point. Of the 16 certification samples, a total of 12 will be submitted for analysis. In order to select the 12 samples for analysis and still provide good areal coverage, each CU is divided into quadrants, with each quadrant containing four sample locations. Three of the four samples from each quadrant are then randomly selected for analysis, resulting in a total of 12 samples analyzed per CU. The other four samples from each CU are to be archived and analyzed only if necessary.

4.2 ANALYTICAL METHODOLOGY AND STATISTICAL ANALYSIS

Laboratory analyses of certification samples will be conducted using an approved analytical method, as discussed in Appendix H of the SEP. Analyses will be conducted to either Analytical Support Level (ASL) D or E. All requirements for ASL E are the same as ASL D except that the minimum detection level for the selected analytical method must be at least 10 percent of FRL. All results will be validated to ASL B, and a minimum of 10 percent (one of the two CUs) of the results will be validated to ASL D. The CU to be validated to ASL D (A2P2-SP3-C-1) is randomly selected. Samples rejected during validation will be re-analyzed, or an alternate sample may be collected and substituted if there is insufficient material available from the initial sample. If any sample fails validation, all data from the laboratory with the rejected result will then be validated to ASL D to determine the integrity of all data from that laboratory. Once data are validated, results will be entered into the SED, and a statistical analysis will be performed to evaluate the pass/fail criteria for the each CU. The statistical approach is discussed in Section 3.4.3 and Appendix G of the SEP.

Two criteria must be met for the CU to be certified as passing. If the data distribution is normal or lognormal, the first criterion compares the 95 percent Upper Confidence Limit (UCL) on the mean of each primary COC to its FRL. On an individual CU basis, any ASCOC with the 95 percent UCL above

the FRL results in that CU failing certification. If the data distribution is not normal or lognormal, the appropriate nonparametric approach discussed in Appendix G of the SEP will be used to evaluate the second criterion. The second criterion is related to individual samples. An individual sample cannot be greater than two times the FRL or three times the FRL, based on its size. See Figure 3-11 of the SEP for further details. When the given UCL on the mean for each COC is less than its FRL, and the hot spot criterion is met, the CU has met both criteria and will be considered certified.

There are three conditions that could result in a CU failing certification: 1) high variability in the data set, 2) localized contamination, and 3) widespread contamination. Details on the evaluation and responses to these possible outcomes are provided in Section 3.4.5 of the SEP. When all CUs within the scope of this CDL have passed certification, a Certification Report will be issued. The Certification Report will be submitted to the regulatory agencies to receive acknowledgment that the pertinent operable unit remedial actions were completed and the individual CUs are certified to be released for interim or final land use. Section 7.4 of the SEP provides additional details and describes the required content of the Certification Report.

4.3 STORMWATER, EROSION AND SEDIMENT CONTROL

An earthern berm on the north and east side of SP3 will be used, along with natural depressions, in lieu of a silt fence to deter runoff (generally Southwest to Northeast) and reduce the sediment load to the existing ditch to the north and Storm Sewer Outfall Ditch. Once certification samples are taken, the certification area will be used for additional soil conditioning and permanent seed trials as a part of testing by the Natural Resource Restoration group.

4.4 SURVEY MONUMENTS

There are no survey monuments within the SP3 footprint boundary.

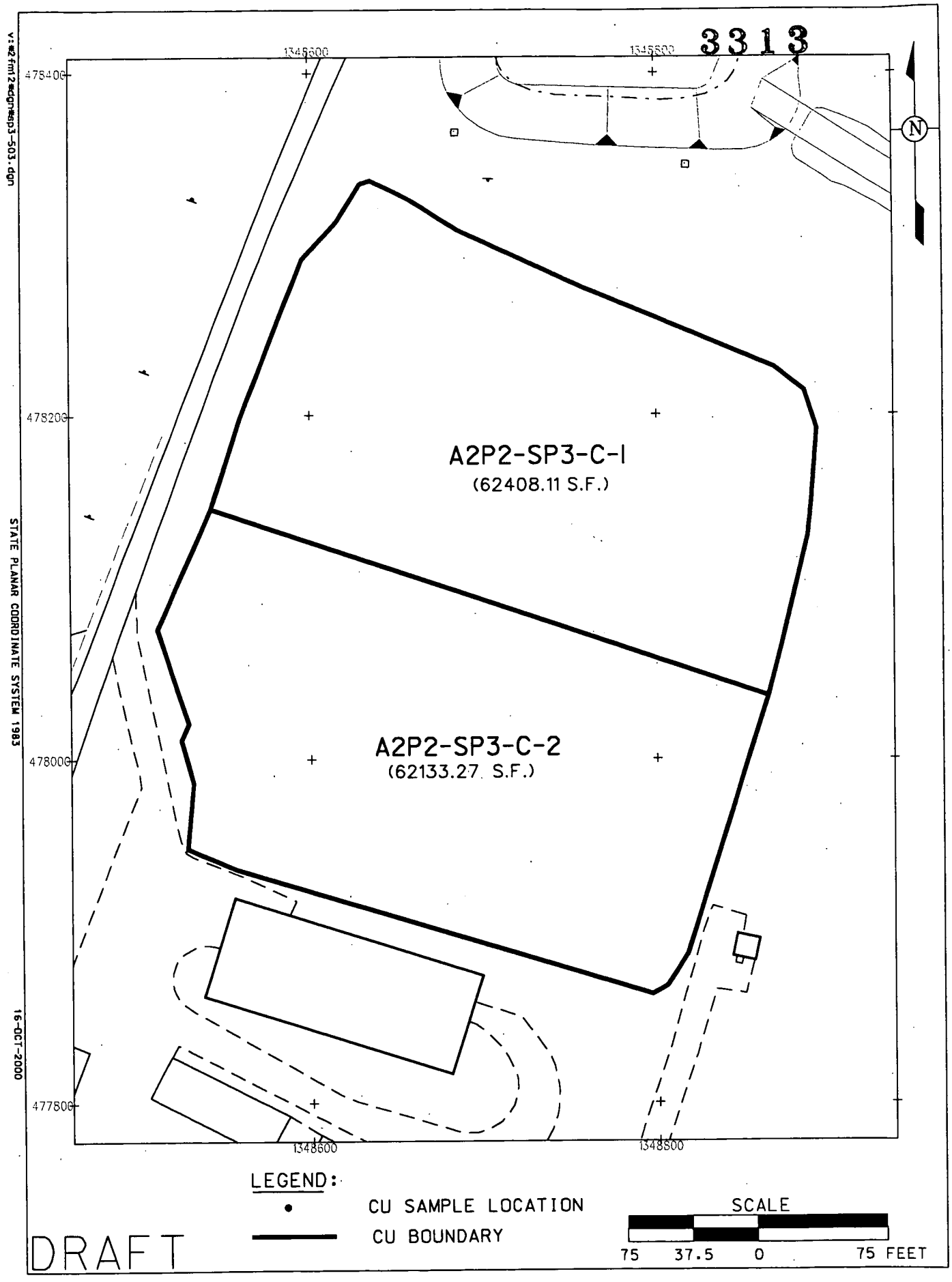

FIGURE 4-1. A2PII SP-3 CERTIFICATION UNITS

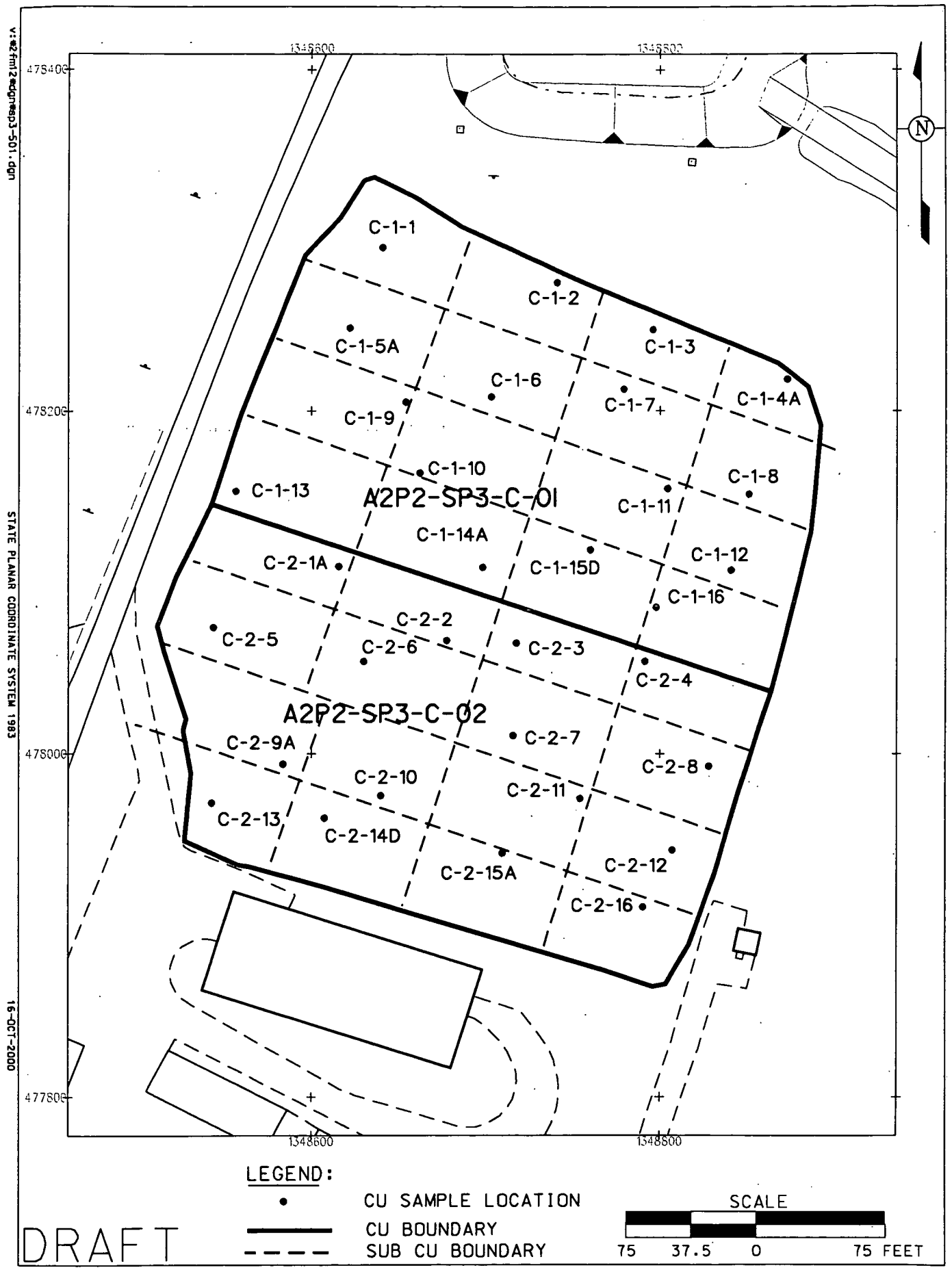

FIGURE 4-2. A2PII SP-3 CU SAMPLE LOCATIONS

5.0 SCHEDULE

The following SP3 footprint draft schedule shows key activities for the completion of the work within the scope of this CDL.

SP3 Footprint Activity	Target Date
Submittal of Certification Design Letter	October 17, 2000
Start of Certification Sampling	October 30, 2000
Complete Certification Sampling	November 13, 2000
Complete Analytical Work	January 5, 2001
Complete Data Validation/Statistical Analysis	January 19, 2001
Submit SP3 Footprint Certification Report to EPA and OEPA	February 2, 2001

* Only the dates for submittal of the CDL and Certification Report are commitments to the EPA and OEPA. Other dates are internal target completion dates.

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APPENDIX A

SP3 WAC SAMPLING DATA

APPENDIX A
STOCKPILE 3 PHYSICAL SAMPLE RESULTS

Sample ID	Sample Depths at Boring Location (feet)	Total Uranium (ppm)	Qualifier	Tech-99 (pCi/g)	Qualifier
SP3-1-1-R	0.0-0.5	4.5	-	0.78	U
SP3-2-9-R	4.0-4.5	2.17	NV	0.84	UNV
SP3-2-16-R	7.5-8.0	2.8	NV	0.93	UNV
SP3-3-1-R	0.0-0.5	3	-	0.91	U
SP3-3-10-R	4.5-5.0	3.06	-	0.88	U
SP3-4-1-R	0.0-0.5	5.5	-	0.86	U
SP3-5-5-R	2.0-2.5	11.2	-	0.84	U
SP3-5-12-R	5.5-6.0	10.2	-	0.86	U
SP3-6-10-R	4.5-5.0	12	NV	1.1	NV
SP3-6-15-R	7.0-7.5	3.06	NV	0.92	UNV
SP3-7-13-R	6.0-6.5	11.9	NV	0.77	UNV
SP3-7-24-R	11.5-12.0	2.06	NV	0.82	UNV
SP3-8-7-R	3.0-3.5	10.7	NV	0.97	UNV
SP3-8-9-R	4.0-4.5	10.9	NV	0.9	UNV
SP3-9-3-R	1.0-1.5	13.3	-	0.84	U
SP3-9-16-R	7.5-8.0	2.52	-	0.85	U
SP3-10-14-R	6.5-7.0	8.23	NV	1.4	UNV
SP3-10-34-R	16.5-17.0	2.7	NV	1.3	UNV
SP3-11-3-R	1.0-1.5	5.6	NV	0.84	UNV
SP3-11-21-R	10.0-10.5	1.85	NV	0.88	UNV
SP3-11-42-R	20.5-21.0	1.37	NV	1	UNV
SP3-12-12-R	5.5-6.0	14.9	NV	1.3	UNV
SP3-12-37-R	18.0-18.5	4.18	NV	1.3	UNV
SP3-13-1-R	0.0-0.5	3.27	-	0.88	U
SP3-13-17-R	8.0-8.5	7.95	-	0.77	U
SP3-14-3-R	1.0-1.5	6.36	NV	0.8	UNV
SP3-14-33-R	16.0-16.5	5.8	NV	1.2	UNV
SP3-14-52-R	25.5-26.0	3.44	NV	1.3	UNV
SP3-15-8-R	3.5-4.0	17.4	NV	0.9	UNV
SP3-15-34-R	16.5-17.0	15.3	NV	1.1	UNV
SP3-15-53-R	26.0-26.5	2.3	NV	0.85	UNV
SP3-16-4-R	1.5-2.0	2.7	NV	1	UNV
SP3-16-13-R	6.0-6.5	2.17	NV	1.1	UNV
SP3-17-3-R	1.0-1.5	8.51	NV	0.96	UNV
SP3-18-11-R	5.0-5.5	5.98	NV	1.3	UNV
SP3-18-17-R	8.0-8.5	6.92	NV	1.4	UNV
SP3-18-35-R	17.0-17.5	11.2	NV	1.2	UNV
SP3-19-10-R	4.5-5.0	4.36	NV	1.2	UNV
SP3-19-21-R	10.0-10.5	9.28	NV	1.2	UNV
SP3-19-42-R	20.5-21.0	2.47	NV	1.3	UNV
SP3-20-1-R	0.0-0.5	13.8	NV	0.95	UNV
SP3-20-14-R	6.5-7.0	22.9	NV	0.93	UNV
SP3-21-1-R	0.0-0.5	18	-	0.86	U
SP3-22-7-R	3.0-3.5	6.27	NV	0.87	UNV
SP3-23-9-R	4.0-4.5	17.8	NV	1	UNV
SP3-23-20-R	9.5-10.0	6.63	NV	1.1	UNV
SP3-24-6-R	2.5-3.0	5.55	NV	0.98	UNV
SP3-24-13-R	6.0-6.5	13	NV	0.93	UNV

U undected at minimum detectable concentration (MDC)

UNV undected at minimum detectable concentration, non validated

NV non validated

- no data qualifier for positive result

APPENDIX B

PREDESIGN DATA

APPENDIX B
SP3 FOOTPRINT PREDESIGN PHYSICAL SAMPLE RESULTS

Sample ID	Sample Depth Interval	Parameter	Result	Qualifier
SP3-P-1A-1-R	0-0.5	Radium-226	1.114	-
SP3-P-1A-1-R	0-0.5	Radium-228	0.839	-
SP3-P-1A-1-R	0-0.5	Thorium-228	0.847	-
SP3-P-1A-1-R	0-0.5	Thorium-232	0.839	-
SP3-P-1A-1-R	0-0.5	Uranium, Total	6.007	-
SP3-P-3A-1-R	0-0.5	Radium-226	1.139	-
SP3-P-3A-1-R	0-0.5	Radium-228	0.876	-
SP3-P-3A-1-R	0-0.5	Thorium-228	0.874	-
SP3-P-3A-1-R	0-0.5	Thorium-232	0.876	-
SP3-P-3A-1-R	0-0.5	Uranium, Total	6.059	-
SP3-P-4-1-R	0-0.5	Radium-226	1.336	-
SP3-P-4-1-R	0-0.5	Radium-228	1.14	-
SP3-P-4-1-R	0-0.5	Thorium-228	1.111	-
SP3-P-4-1-R	0-0.5	Thorium-232	1.14	-
SP3-P-4-1-R	0-0.5	Uranium, Total	3.821	J
SP3-P-10-1-R	0-0.5	Radium-226	1.1	NV
SP3-P-10-1-R	0-0.5	Radium-228	0.78	NV
SP3-P-10-1-R	0-0.5	Thorium-228	0.75	NV
SP3-P-10-1-R	0-0.5	Thorium-232	0.78	NV
SP3-P-10-1-R	0-0.5	Uranium, Total	9.4	NV
SP3-P-11-1-R	0-0.5	Radium-226	1	NV
SP3-P-11-1-R	0-0.5	Radium-228	0.83	NV
SP3-P-11-1-R	0-0.5	Thorium-228	0.82	NV
SP3-P-11-1-R	0-0.5	Thorium-232	0.83	NV
SP3-P-11-1-R	0-0.5	Uranium, Total	3.2	NV
SP3-P-15A-1-R	0-0.5	Radium-226	1	NV
SP3-P-15A-1-R	0-0.5	Radium-228	0.76	NV
SP3-P-15A-1-R	0-0.5	Thorium-228	0.74	NV
SP3-P-15A-1-R	0-0.5	Thorium-232	0.76	NV
SP3-P-15A-1-R	0-0.5	Uranium, Total	7.5	NV
SP3-P-17-1-R	0-0.5	Radium-226	1.1	NV
SP3-P-17-1-R	0-0.5	Radium-228	0.85	NV
SP3-P-17-1-R	0-0.5	Thorium-228	0.85	NV
SP3-P-17-1-R	0-0.5	Thorium-232	0.85	NV
SP3-P-17-1-R	0-0.5	Uranium, Total	9.3	NV
SP3-P-21-1-R	0-0.5	Radium-226	1.592	-
SP3-P-21-1-R	0-0.5	Radium-228	1.216	-
SP3-P-21-1-R	0-0.5	Thorium-228	1.171	-
SP3-P-21-1-R	0-0.5	Thorium-232	1.216	-
SP3-P-21-1-R	0-0.5	Uranium, Total	17.734	-
SP3-P-22-1-R	0-0.5	Radium-226	1.1	NV
SP3-P-22-1-R	0-0.5	Radium-228	0.75	NV
SP3-P-22-1-R	0-0.5	Thorium-228	0.73	NV
SP3-P-22-1-R	0-0.5	Thorium-232	0.75	NV
SP3-P-22-1-R	0-0.5	Uranium, Total	4.7	NV
SP3-P-23-1-R	0-0.5	Radium-226	1.3	NV
SP3-P-23-1-R	0-0.5	Radium-228	0.92	NV
SP3-P-23-1-R	0-0.5	Thorium-228	0.88	NV
SP3-P-23-1-R	0-0.5	Thorium-232	0.92	NV
SP3-P-23-1-R	0-0.5	Uranium, Total	9.7	NV

U undetected at minimum detectable concentration (MDC)
UNV undetected at MDC, non-validated
NV non-validated
- no data qualifier for positive result

APPENDIX C

PRECERTIFICATION DATA

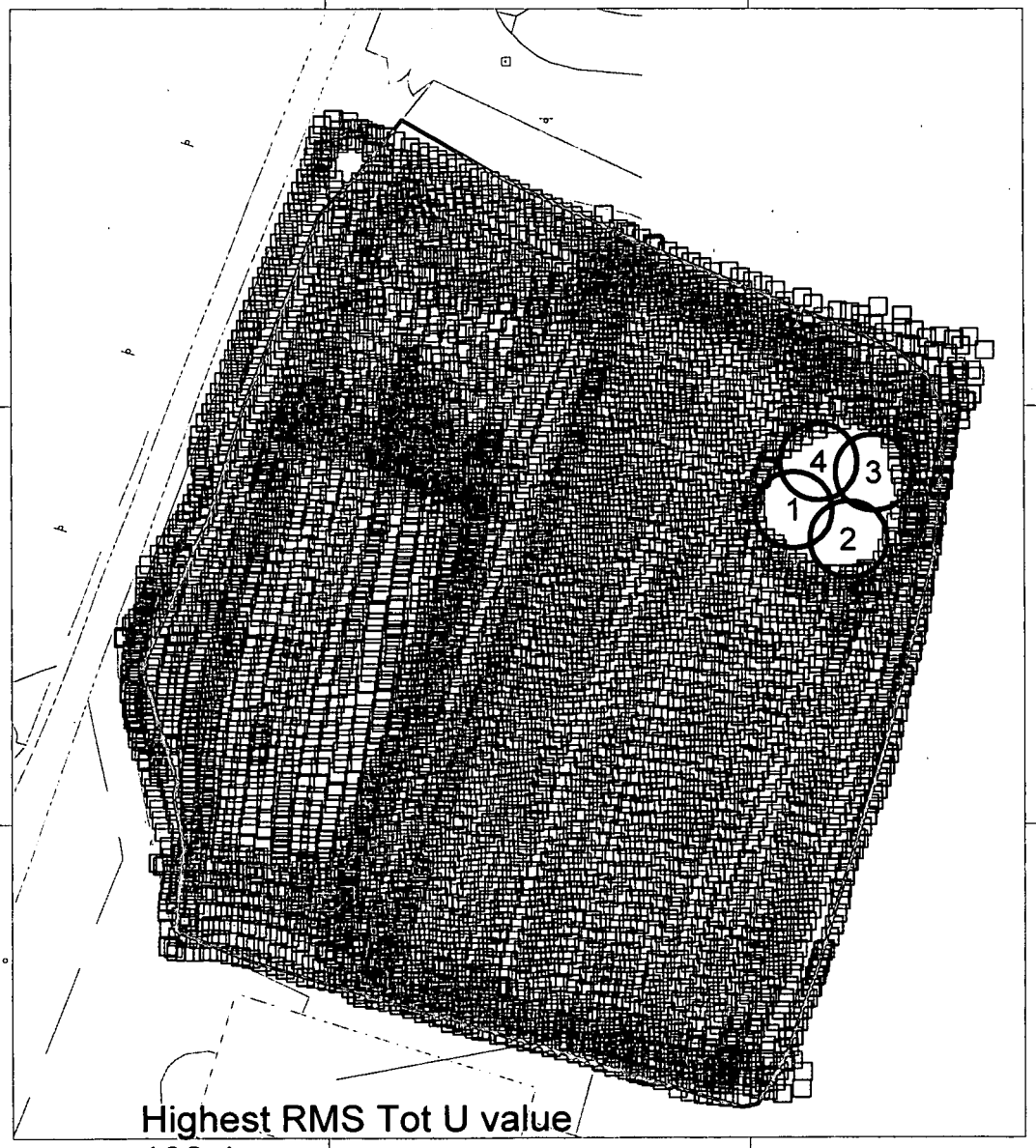
A2P2 Part 3

Soil Pile 3 Footprint

Moisture Corrected Total Uranium

RTRK Batch#: 830, 840, 844
RSS Batch#: 626
HPGE #31204
Two Spectra Average
Coverage Plot (Field of View 2.4 m radius)
Measurement Dates: 08/04/00-10/12/00

N



478200

478000

Highest RMS Tot U value
100.4 ppm

1348600

1348800

RMS Total Uranium (ppm)	HPGE Total Uranium (ppm)
-43.20 to 41.00	0.00 to 41.00
41.00 to 82.00	41.00 to 82.00
82.00 to 164.00	82.00 to 164.00
164.00 to 246.00	164.00 to 246.00
246.00 to 10000.00	246.00 to 10000.00

RTIMP DWG Title: A2P2 -PT3-TU-2PT-MC
Project #: 20450-PSP-0001
Project Name: PreDesign Sampling in A2P2 Pt 2&3
Prepared By: David Allen
File: A2P2_PT3_TU_2PT_MC.srf
Date Prepared: 10/12/00

A2P2 Part 3

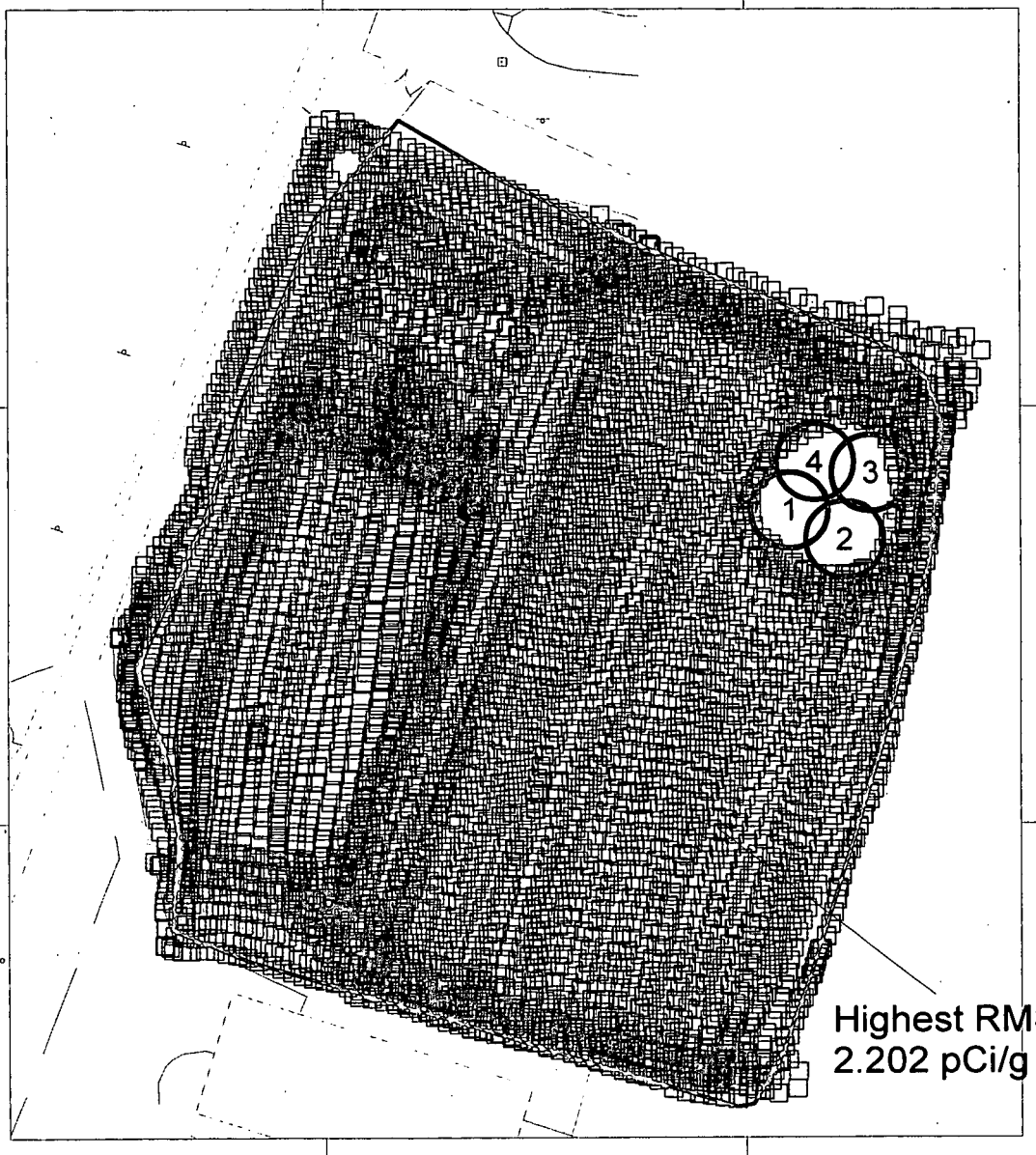
_3313

Soil Pile 3 Footprint

Moisture & Radon Corrected Radium 226

RTRK Batch#: 830, 840, 844
RSS Batch#: 626
HPGE #31204
Two Spectra Average
Coverage Plot (Field of View 2.4 m radius)
Measurement Dates: 08/04/00-10/12/00

N



RMS Ra-226 (pCi/g)
-0.20 to 0.85
0.85 to 1.70
1.70 to 3.40
3.40 to 5.10
5.10 to 10000.00

HPGE Ra-226 (pCi/g)
0.00 to 0.85
0.85 to 1.70
1.70 to 3.40
3.40 to 5.10
5.10 to 10000.00

RTIMP DWG Title: A2P2 -PT3-RA-2PT-MC
Project #: 20450-PSP-0001
Project Name: PreDesign Sampling in A2P2 Pt 2&3
Prepared By: David Allen
File: A2P2_PT3_RA_2PT_MC.srf
Date Prepared: 10/12/00

000031

A2P2 Part 3

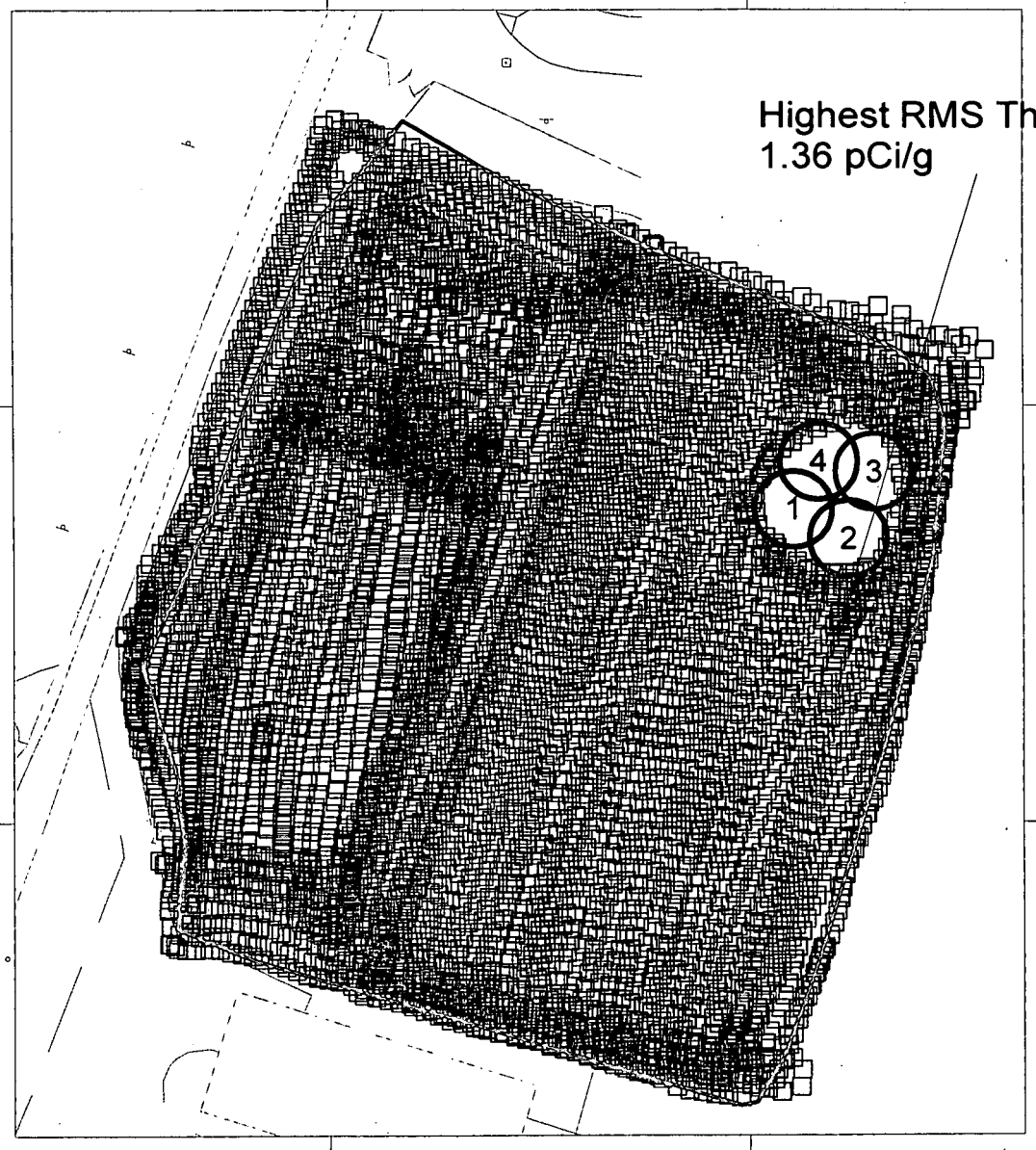
3313

Soil Pile 3 Footprint

Moisture Corrected Thorium 232

RTRK Batch#: 830, 840, 844
RSS Batch#: 626
HPGE #31204
Two Spectra Average
Coverage Plot (Field of View 2.4 m radius)
Measurement Dates: 08/04/00-10/12/00

N



478200

478000

1348600

1348800

RMS Th-232 (pCi/g)
-0.10 to 0.75
0.75 to 1.50
1.50 to 3.00
3.00 to 4.50
4.50 to 10000.00

HPGE Th-232 (pCi/g)
0.00 to 0.75
0.75 to 1.50
1.50 to 3.00
3.00 to 4.50
4.50 to 10000.00

RTIMP DWG Title: A2P2 -PT3-TH-2PT-MC
Project #: 20450-PSP-0001
Project Name: PreDesign Sampling in A2P2 Pt 2&3
Prepared By: David Allen
File: A2P2_PT3_TH_2PT_MC.srf
Date Prepared: 10/12/00

A2P2 Part 3

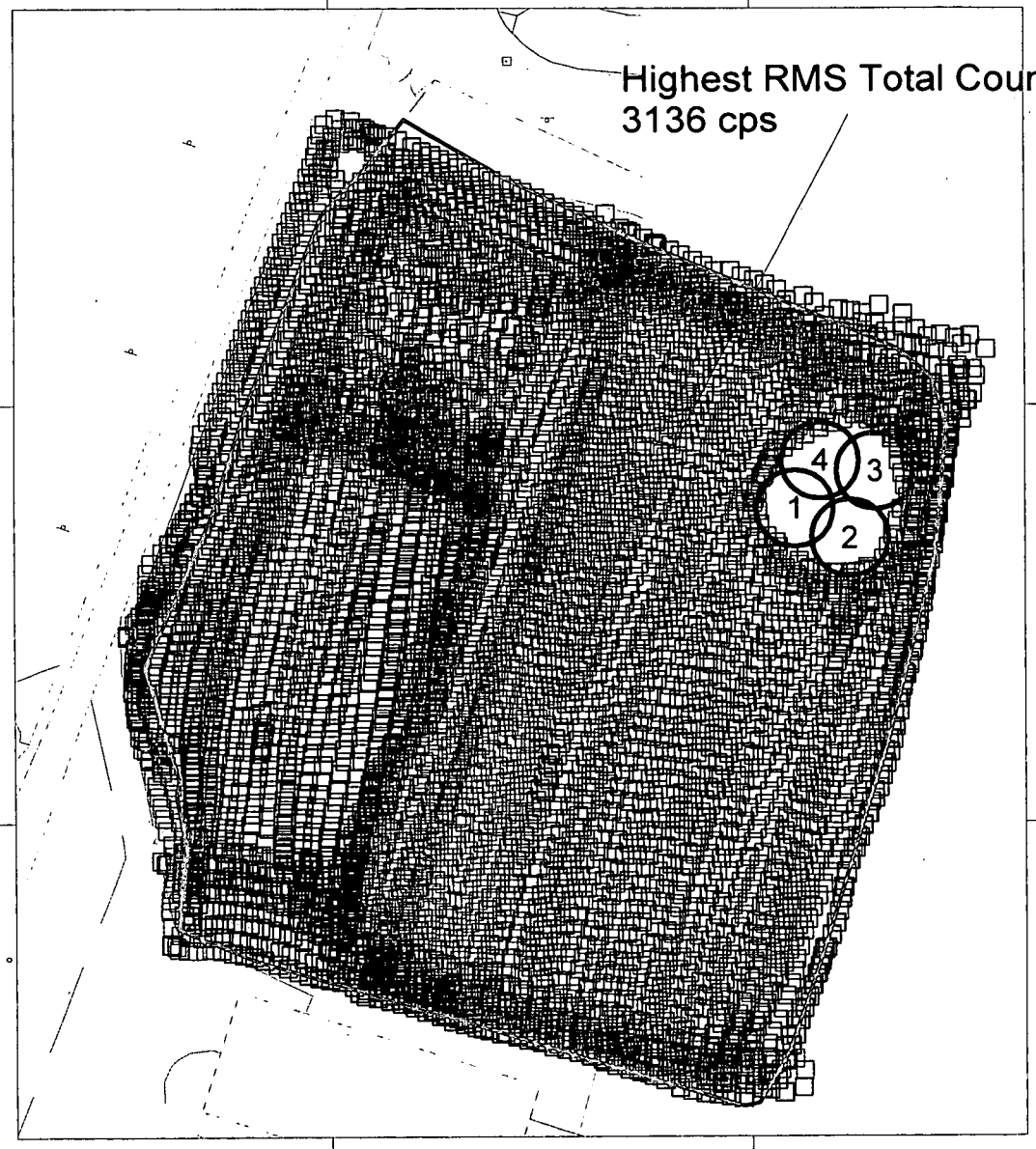
Soil Pile 3 Footprint

Total Counts per Second

3313

RTRK Batch#: 830, 840, 844
RSS Batch#: 626
HPGE #31204
One Spectrum, No Average
Coverage Plot (Field of View 2.4 m radius)
Measurement Dates: 08/04/00-10/12/00

N



HPGE locations shown for coverage only

RMS
Total Counts (cps)

- 0.00 to 2000.00
- 2000.00 to 2500.00
- 2500.00 to 3000.00
- 3000.00 to 10000.00

RTIMP DWG Title: A2P2 -PT3-TC-1PT-MC
Project #: 20450-PSP-0001
Project Name: PreDesign Sampling in A2P2 Pt 2&3
Prepared By: David Allen
File: A2P2_PT3_TC_1PT_MC.srf
Date Prepared: 10/12/00